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Principal Investigator: Allen Shafter

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This report summarizes the status of our *ROSAT* study of the HEAO-I X-ray source and potential DQ Her star, 1H0709 – 360. Tuohy *et al.* (1990) were the first to optically identify 1H0709 – 360, obtaining extensive photometric and spectroscopic observations of the system. Their optical spectrum revealed strong He II λ 4686 and He II λ 5411 emission, and a time-series analysis of their optical photometry revealed the possibility of a secondary periodicity near the orbital period. These properties, along with its HEAO-I detection, led Tuohy *et al.* to suggest that 1H0709 – 360 may be a DQ Her system. Time-resolved X-ray observations were deemed necessary to make further progress in understanding the 1H0709 – 360 system.

In addition to displaying characteristics typical of DQ Her systems, 1H0709 – 360 is eclipsing; and has an orbital period of 2.444 hr, placing it near the middle of the gap in the orbital period distribution of cataclysmic variables. A system with an orbital period near the center of the period gap suggests an unusual evolutionary history. It is possible that such systems formed with relatively short orbital periods and have only recently began transferring mass. Another possibility is that their long-term mass transfer rates may have been unusually low.

It is of interest that there are two additional systems in the period gap that have characteristics similar to those of 1H0709 – 360. They are V795 Her (Shafter *et al.* 1990), and V Per (Shafter and Abbott 1989). V795 Her is an unusual CV with an orbital period in the period gap (P=2.6 hr), while V Per is an eclipsing old nova with a slightly shorter period of 2.57 hr. At the time of our proposed observations, both of these systems were considered likely DQ Her systems. V795 Her exhibits a photometric periodicity distinct from its spectroscopic period, while the strength of the He II λ 4686 emission and the eclipse profile led Shafter and Abbott (1989) and Wood *et al.* (1991) to suggest that V Per may be a DQ Her system as well. Subsequent to the scheduling of our 1H0709-360 observations, the case that V795 Her is a DQ Her weakened. *ROSAT* observations obtained by myself and E. L. Robinson revealed that V795 Her is a very weak X-ray source, with no evidence for an X-ray periodicity. It now seems possible, indeed likely, that V795 Her is in fact related to the SU UMa dwarf novae. In this interpretation the discrepant photometric and spectroscopic periods are explained by the presence of "superhumps" having a period slightly longer than the spectroscopic orbital period.

Lasr year we successfully obtained and reduced ~ 14Ksec of PSPC data on 1H0709 – 360. Our principal goal was to search for a periodic signal in the X-ray flux that would be characteristic of the rotation of an accreting magnetized white dwarf in the system. A detection of an X-ray periodicity distinct from the orbital period would provide the first direct evidence that 1H0709 – 360 is in fact a DQ Her system.

In view of the results on V795 Her, we were merely somewhat surprised, rather than shocked to discover that our *ROSAT* observations barely detected 1H0709 – 360. Our

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14Ksec of data neted a grand total of 72 detected photons! This count rate was far too low to enable us to conduct a meaningful timing analysis; however, the observations were of interest nevertheless. In particular, they established that the X-ray flux from 1H0709 – 360 is variable, being considerably lower than the expected count rate based on the HEAO-1 data. [The 1H0709 – 360 system was detected by HEAO-I at a flux level of from $2 - 6 \times 10^{-11}$ $erg\ cm^{-2}\ s^{-1}$ in the 2-10 keV bandpass (Tuohy *et al.* 1990).] 1H0709 – 360 is one of the very rare deeply eclipsing CVs detected with HEAO-1. No other eclipsing DQ Her system had been observed to have such a strong X-ray flux.

It is important to eventually establish the nature of 1H0709 – 360 because of the possibility that DQ Her systems may be quite common in the period gap, and therefore may be important for understanding the evolution of cataclysmic variables in general, and the origin of the period gap, in particular. In this regard, it is worth noting that cataclysmic variables with periods below the gap ($P \leq 2\ hr$) are either the strongly magnetic AM Her systems or SU UMa dwarf novae. A popular view is that when magnetic cataclysmic variables evolve towards shorter orbital periods they evolve from DQ Her systems at periods generally greater than 3 hr to AM Her systems at shorter periods where the stellar separations are smaller and MHD torques can more easily lock the white dwarfs into synchronous rotation. It may be that the systems in the gap are magnetic systems that are approaching synchronism. Conversely, a fraction of systems in the gap may represent the long period end of the SU UMa dwarf nova period distribution.

In summary, our results on 1H0709 – 360 were disappointing because of the weak X-ray flux detected by *ROSAT*. Nevertheless a weak detection is of interest and our work on 1H0709−360 continues. Our immediate plan is to combine our *ROSAT* results from V795 Her and 1H0709−360 into a single paper discussing the issues raised above. We also have learned that *ROSAT* observations of 1H0709−360 obtained by J. Osborne (UK) failed to detect a strong X-ray signal. We plan to contact Osborne and propose a collaboration to jointly publish our 1H0709 – 360 results.